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SUBJECT: OPPORTUNITIES IN SPAIN'S GROWING ENERGY MARKET

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1. SUMMARY: Since joining the EU in 1986, Spain has experienced dramatic industrialization and economic development. Along with development, energy consumption has skyrocketed and shows no sign of abating. These developments bring challenges for a country that is now emitting greenhouse gasses more than its Kyoto commitments permit, and exceeding EU pollution emissions limits. Spain has an ambitious but likely untenable plan for meeting the EU requirement to supply 12 percent of its energy needs through renewables by 2010, and will increasingly rely on natural gas imports as a relatively clean and inexpensive energy source. There are opportunities for US business to enter the Spanish energy market in such areas as gas, combined cycle generation and renewables, although experience to date suggests it may be advantageous to start small and learn the ropes, meet niche market demand, or enter into joint ventures with local companies rather than go it alone. END SUMMARY.

2. Spain's economy continues to be one of the most dynamic in the European Union, growing an average of 3.5 percent over the past six years. Spain's demand for energy has grown even faster at an average rate of 4.5 percent per year between 1998 and 2002, with electrical demand increasing at a particularly rapid rate of 6 percent per year. Growth in total energy demand is expected continue at 3.5 percent annually over the next decade. Spain is attempting to increase capacity to meet current and future demand through a combination of sources, including new natural gas pipelines from Africa and construction of combined-cycle electric generation facilities, while attempting to mitigate emissions increases through significant investment in alternative energy sources, especially wind power.

Following is an overview of the energy market and suggestions for U.S. companies wishing to take advantage of significant opportunities.

#### ENERGY LIBERALIZATION AHEAD OF SCHEDULE

3. Spain is implementing deregulation faster than most other EU countries. Spain has adopted legislation to allow third-party access to the power network, and scheduled full liberalization of the energy market through various phases by 2013. So far, the primary benefit of liberalization is consumer choice among energy providers. To date, price-based competition has been minimal.

4. Under a June 2000 law, Spain commenced separation of transmission, generation and distribution functions, and opened the energy grid to other suppliers several years before EU initiatives began forcing changes. The oil, natural gas, and electricity markets have been key liberalization targets during the Aznar administration. In the petroleum market, former government-owned Repsol was privatized in 1997 and is now Repsol-YPF (following a merger with Argentine company YPF). It has reduced ownership from 62% to around 26% in Compania Logistica de Hidrocarburos (CLH), the petroleum distribution company. In natural gas, the market for industrial customers was partially opened in 2000, and in 2002 the dominant conglomerate, Gas Natural Group, reduced its interest from 100% to 35% in the distribution company, Enagas. Spain's largest electricity utility, Endesa, was privatized in June 1998. Customers may now select their electricity supplier, and Spain has recently signed a pact with Portugal to form a single power market. As liberalization continues, and competitive forces strengthen in the energy sector, US business may find a myriad of opportunities for penetrating the Spanish energy market.

#### NATURAL GAS

5. By 2010, the International Energy Association (IEA) anticipates that over 24 percent of Spain's electricity will be generated from natural gas. This is up from 9.2 percent in 1999, and only one percent in 1990. In 2003, natural gas accounted for 14% of the energy consumed in Spain. In real terms, natural gas consumption is skyrocketing, with around 1.7 million tons of oil equivalent (Mtoe) used in 1985, 10 Mtoe in 1999, and 13.5 Mtoe expected for 2010.

6. Although virtually all natural gas must be imported, its increased use may enable Spain to reduce its greenhouse gas emissions. Spain has historically imported its natural gas

from Algeria and Norway. Libya has also been an important source. Nigeria and Trinidad & Tobago are becoming major suppliers.

17. The Pedro Duran Farell pipeline connects Algerian natural gas supplies with the Iberian Peninsula, passing through Morocco and into Spain via the Strait of Gibraltar. Spain is also connected to European supplies through the Lacq-Calahorra pipeline that runs from France. The planned MEDGAZ pipeline will link the Algerian supply directly with Spain. MEDGAZ partners include Sonatrach (Algeria's national oil company), Spanish companies CEPSA, ENDESA, and Iberdrola, BP, TOTAL, and Gaz de France. With the new pipeline, imports from Algeria are projected to supply 60% of Spain's natural gas demand, but given the supply diversification strategies of the major players, this will actually signify a reduction in Algeria's share of the market.

18. Gas Natural is the leading natural gas conglomerate in Spain. During the first quarter of 2002, Gas Natural maintained a 72 percent share of the liberalized gas market and gained a 4 percent share of the electricity market.

19. The US company AES, after years of regulatory delays, is constructing a 400 MW combined cycle facility in Cartagena, which is estimated to contribute over 500 jobs and more than \$1 billion to the local economy.

#### PETROLEUM

10. Oil plays a vital but decreasing role in Spain. The IEA estimates that by 2010, only 7.6 percent of electricity will be generated from oil, down from 11.8 percent in 1999. Industrial and residential demand for oil is predicted to remain level while demand from the transportation industry will continue to grow for several years before leveling off.

11. The petroleum market is dominated by vertically-integrated REPSOL-YPF which provides over 50% of Spain's petroleum, although Cepsa and BP have significant interests as well. Almost all oil is imported, with Nigeria, Libya, Saudi Arabia and Algeria being primary sources. Repsol-YPF also continues to invest heavily overseas. In the last year, Repsol-YPF has announced major new projects in Venezuela, Iran and Libya, in addition to its enormous investment in Argentina.

#### NUCLEAR ENERGY

12. The IEA estimates that by 2010, 24.4 percent of Spain's electricity will be generated from nuclear energy. This is down from 28.5 in 1999 and 35.9 in 1990. Majority or total ownership of all nine nuclear facilities is held by large Spanish energy companies Union Fenosa, Iberdrola, and Endesa. The plants, built from 1971-1988, have the capacity to generate 7,897 megavolts.

13. A political moratorium on construction of new nuclear power plants was established in 1984 under the Socialist government, and not challenged by the current center-right government. The government plans to maintain the number of licenses until 2012, and will only close individual plants if they outlive their usefulness. However, because of Kyoto commitments, some believe the GOS may move towards a new program if the incumbent Popular Party carries the March 2004 general elections. The opposition PSOE has called for a formal nuclear moratorium within five years. The Spanish public is not mobilized against nuclear energy, although groups such as Greenpeace have occasionally "tested" NPP security measures by trying to breach facilities and have protested against alleged safety deficiencies.

#### COAL

14. The leading producers of hard coal in Spain are state-owned Hunosa and privatized Encasur, while Endesa is the leading producer of lignite. The United States is a major exporter of coal to Spain. The IEA estimates that by 2010, 14.2 percent of Spain's electricity will be generated from coal, down from 36.6 percent in 1999 and 40.1 percent in 1990. However, in real terms, coal consumption is expected to increase slightly over the next few years, before leveling off.

15. Spain's coal costs far more than current world market prices. A traditionally protected industry, some energy experts claim that Spain could save money by eliminating subsidies, shutting down the mines, and giving all current miners lifelong pensions. But political factors would make a total shutdown difficult. Coal production has been a significant industry in the northern coal-producing regions of the country, which are suffering from high unemployment. Rather than cutting production drastically and facing radically higher unemployment, Spain has initiated a program to wean domestic coal mining from subsidies and face world market conditions.

## HYDRO

¶16. According to the IEA, 14.7 percent of Spain's electricity will be generated from hydropower by 2010. Although it is anticipated that hydropower will produce 50% more power in 2010 than in 1999, its proportional share of total energy transformation to electricity will increase only 3.6% largely due to the anticipated stronger increase in utilization of natural gas.

¶17. Large-scale hydroelectric production is expected to decrease from 2.645 Mtoe in 1998 to 2.121 Mtoe in 2010. Recouping that loss will be small scale hydro (less than 10 megawatts (MW)) production growing from 0.482 Mtoe to 0.594 Mtoe, and 10 to 50 MW hydro facilities contributing 0.542 Mtoe. The large hydropower plants are owned by Iberdrola, Endesa, Union Fenosa, Hidrocanabrico and Viesgo (affiliated with Italy's Enel). These same companies own many smaller facilities as well. Local engineering and construction company consortiums also build and operate small facilities.

## RENEWABLES: WIND AND SOLAR POWER

¶18. Sunny, mountainous Spain is a prime prospect for wind and solar power generation. As technology progresses and provides less expensive means of harnessing the power of the wind and the sun, Spain may use these power sources to great advantage as it seeks to reduce emissions.

¶19. Significant financial incentives, primarily sourced through EU cohesion funds, have caused most Spanish energy companies to develop renewables projects. With approximately \$1.5 billion allocated for environmental purposes, the central government distributes some funding to the regions for projects. Along with the funds, the regional and local governments often provide additional incentives such as tax benefits and land donation or discount. However, when the cohesion funds stop in 2007, it remains to be seen how much additional development will continue.

## WIND ENERGY

¶20. Spain is one of the world's largest wind energy producers along with the U.S. and Germany. The land of Don Quixote and his windmills has long used wind for power generation. But only recently have large-scale efforts begun to exploit this renewable energy source.

¶21. At the end of 1998, Spain generated only 800 MW from wind. That almost doubled in 1999, and in 2003 total installed wind energy reached 6,202 MW. Plans call for capacity increase to about 9,000 MW by 2010, and Spain is on its way to meeting that goal. Regions with the most installed wind power generation are Galicia, Navarra, Castilla-La Mancha, Aragon and Asturias.

¶22. Some energy companies with interests in primary energy sources have also invested in wind generation facilities, among them Gamesa (the strongest), Iberdrola and Endesa. Additionally, smaller generators have emerged and several foreign developers, including American-owned Global 3 (see Paragraph 31), have plans to invest in wind power in Spain.

## SOLAR ENERGY

¶23. Still too expensive to compete with primary energy sources and wind power, current cost efficiency has not stopped research efforts or government incentives for small investment in solar power. CIEMAT, the energy and environmental research arm of the Ministry of Science and Technology, has a solar platform research/production facility in southeastern Spain in the Desert of Tabernas. It was developed to offer researchers a place where the climatic conditions are optimal for researching solar power production such as could be used within the sunbelt.

¶24. Prosolmed, a group of engineers and economists in the orange-growing region of Valencia, has taken advantage of some incentives for small-scale production and is trying to help city-living small investors get in on the action. Prosolmed claims that investors can enjoy a rate of return greater than 10%, and has installed 100 small solar panels, each occupying 50 square meters. An article likens this venture to earlier Spanish tree plantation investment opportunities. According to the article, a secondary market now exists for these plantation interests, suggesting that small investment solar opportunities might also be successful on Spain.

¶25. Solar energy technology still needs to advance and become more cost-competitive before it can supply a significant portion of the country's renewable energy goals. In 2001, Spain collected only 35 ktep (equivalent to 35,000 tons of oil) of energy generated through solarthermic installations, and 2 ktep from photovoltaic installations. Spain's goals by 2010 include generation of 336 ktep from

solarthermic sources, and 19 ktep from photovoltaic installations.

#### ELECTRICAL DISTRIBUTION

126. Red Elctrica de Espaa (REE) is Spain's electricity transmission grid and system operator. The GOS owns 28.5 percent of REE, with Endesa, Iberdrola, Union Fenosa and Hidrocarburo each holding 10 percent, Viesgo with 1 percent, and the remaining 18 percent and 13 percent held by institutional investors and small shareholders, respectively. The government fixes electricity rates on an annual basis. Only one foreign firm, ESB (of Ireland), currently operates within the Spanish electrical distribution industry, in the Basque region.

127. Although deregulation of this market enables consumers to shop freely for electricity, suppliers are required to sell at rates set by the government. These mandated rates have fallen 35 percent since 1997. But the lack of price competition reduces consumer incentive to change suppliers, making it difficult for competition to thrive.

128. The recently announced integration of the Spanish and Portuguese electricity markets into the "Iberian Electricity Market" will, per Vice President and Economy Minister Rodrigo Rato, form the fourth largest electricity market in Europe in terms of power generation capacity, and the second full-fledged electricity pool after Scandinavia's Nord pool. The new market will allow consumers to choose any electric company within the system as a supplier. With this integration, utility rates should fall; especially in Portugal where the rates are higher than in Spain.

#### MARKET ENTRY BARRIERS

129. Spain is a difficult market for the foreign energy investor to successfully enter due to lack of transparency in bidding and permit processes, as well as the entrenched status of the incumbent companies. Although GOS regulations suggest a liberalized market, large Spanish incumbents, many of which were state-owned monopolies, still control significant market share and have long-established relationships with (and the trust of) their regulating bodies. Additionally, the GOS still holds "golden shares" of Repsol and Endesa. These shares give veto power over corporate decisions that the GOS believes would affect national interest. Spain's dominant energy companies have significant power and sophistication, with Repsol-YPF, Iberdrola and Endesa included in the Financial Times 500 List of top international companies. It is not unusual that a new market entrant must negotiate for access to its dominant competitor's distribution network to get its product to market. Relationships formed in grade school between regulators and corporate leaders also seem to play a strong role. (See refert for more information about Spain's "old boys" network.)

130. When U.S. companies have attempted to enter the Spanish market, they have faced significant delays in obtaining construction and other types of permits, while the Spanish and some other European companies (from countries who have permitted Spanish companies to enter their markets) tend to receive their permits rapidly. While some attribute this to Spain's tendency to trust its incumbents, others add that many foreign companies ineffectually attempt to manage Spanish investment from London offices. Despite difficulties, several US companies are making progress, including AES (see Paragraph 9) and Global 3.

131. Global 3 began in Spain in 1997 by building a one megawatt plant to learn how to work through Spain's labyrinthine permit processes and to prove that they could actually become successful on a small scale. Per one of Global 3's owners, the company has vertically integrated and owns liquefied natural gas storage facilities and pipelines, has developed and operates five power plant projects, and continues developing various energy facilities, including wind farms. The company attributes its success to its approach: starting small, learning Spanish methods, establishing contacts, and building on experience.

132. An alternative approach for penetrating the Spanish market is filling demand within niche markets. Chiptec Corp., a Vermont manufacturer of high fuel efficiency biomass gasification systems, found a Spanish food packing company who wanted to convert food waste into energy. Chiptec sold equipment to suit this purpose in an arrangement valued at over \$1 million, and has continued negotiating for more business in Spain. US companies with products that would enable Spanish firms to increase efficiency or produce energy in non-traditional ways have a potential market in Spain.

#### COMMENT:

133. The Spanish energy sector is changing in a primarily market-driven manner, with natural gas playing a dominant

role in meeting energy needs and wind power playing a role in Spain's efforts to reach 12 percent of energy consumption through renewables by 2010. Predicted strong growth will continue to provide opportunities for U.S. companies, not only in the traditional energy sectors but also in renewables. Independent entry strategies into the Spanish energy market are problematic (but possible) due to permit processes and generally unavoidable negotiation with incumbent competitors for necessary services. Importing energy to Spain's major energy companies for processing and distribution, establishing joint ventures and partnerships with Spanish companies, acquiring small-scale on-the-ground experience, or selling equipment or technology for less typical energy sources such as biomass, are some of the best strategies for US companies to successfully enter the Spanish energy market. End Comment.

ARGYROS